Versatile 3D Imager for Human/Spacecraft Monitoring, Phase I

Completed Technology Project (2018 - 2019)

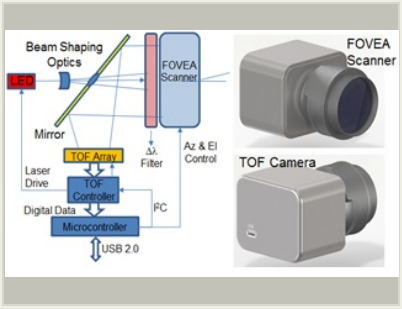
Project Introduction

The proposed effort is to develop a high-definition (HD) 3D imager that provides in real-time high-resolution point cloud data over a wide angle for monitoring human activity from a free-flying robot platform. The objective is to build a compact sensor package that meets the low size, weight and power (SWaP) requirements of the application. The 3D sensor will provide better than 1cm by 1cm by 1cm resolution over a 60-degree by 45-degree field of regard at a standoff distance of 10 meters or more. This 3D imaging capability is achieved using a unique electro-optic step and stare scanner that provides the largest angle-aperture product of any non-mechanical scanning technology.

Anticipated Benefits

The proposed low-SWaP HD 3D imager will have application in many NASA missions needing real-time 3D information such as fixing and refueling spacecraft, autonomous vision-based guidance and control for robotic systems, internal/external spacecraft inspection, 3D environmental mapping and hazard avoidance for autonomous land, air and sea vehicles.

The proposed HD 3D imager has numerous commercial applications. The platform can provide a low-SWaP package for hazard/collision avoidance for autonomous automobiles and unmanned vehicles, which is currently gathering a lot of interest in the commercial sector. Other potential large markets are 3D imaging for autonomous robotics (factory automation), noncontact structure analysis, topographical mapping and gesture recognition for augmented reality systems.



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Small Business Innovation Research/Small Business Tech Transfer

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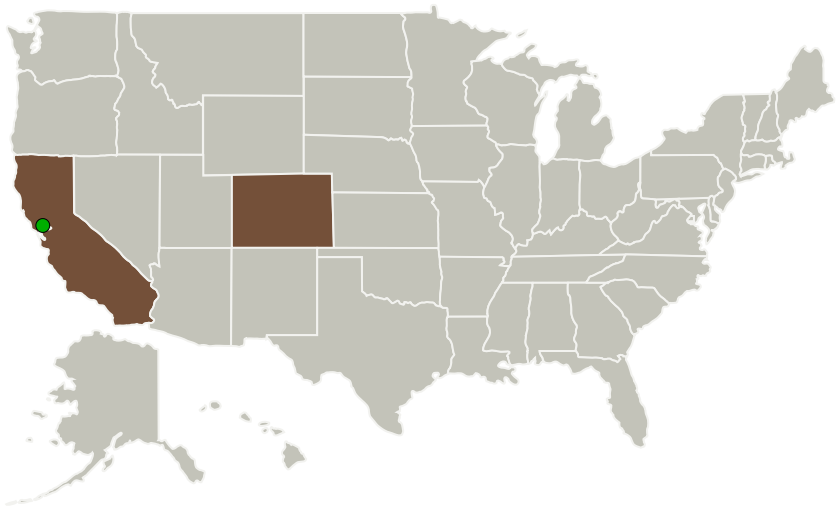
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Boulder Nonlinear Systems, Inc.	Lead Organization	Industry	Lafayette, Colorado
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Colorado

Project Transitions

July 2018: Project Start

February 2019: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/141360)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Boulder Nonlinear Systems, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

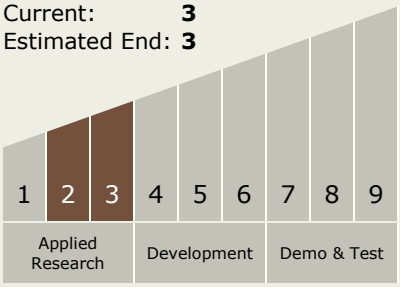
Carlos Torrez

Principal Investigator:

Steve Serati

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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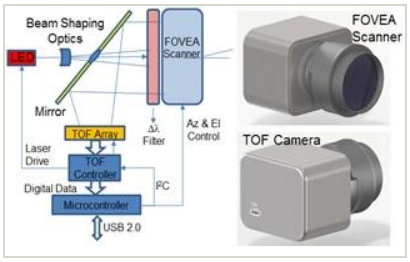
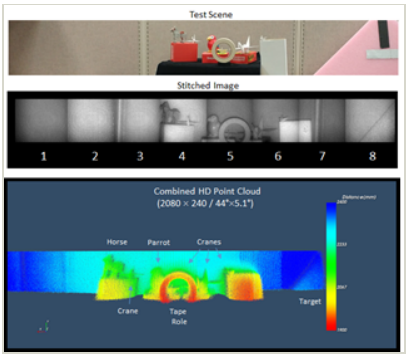
Images



Briefing Chart Image
Versatile 3D Imager for Human/Spacecraft Monitoring, Phase I
(https://techport.nasa.gov/image/134357)



Final Summary Chart Image
Versatile 3D Imager for Human/Spacecraft Monitoring, Phase I
(https://techport.nasa.gov/image/126886)

Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.5 Autonomous Rendezvous and Docking
    - TX04.5.1 Relative Navigation Sensors

Target Destination

Earth